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This Week

Research Notes

Articles

Cover: The stalwart Emperor penguin chooses the coldest and darkest part of the year for incubating its eggs on the frozen sea surface. Biologists working in the Antarctic find unique research opportunities studying the animals that have adapted to this harsh climate. (Photo: Richard Monastersky)

Departments

Letters

Guessing at wood's winning ways

The article on wooden versus plastic cutting boards' antibacterial properties ("Wood wins, plastic trashed for cutting meat," SN: 2/6/93, p.84) has laid to rest one of those nagging questions I've had for years. I always wondered why we all didn't die of food poisoning from my wife's favorite wooden cooking spoons. They are not allowed in the dishwasher, and they always look like hell. This is the sort of science I like — unexpected answers to unexpected questions.

Maybe now someone can discover why all dog owners become stone deaf when their dog barks for hours and hours. . . .

Al Pergande
Orlando, Fla.

Was the research done on end-grain cutting blocks or flat-grain cutting boards or both? I would think the end-grain blocks would show the least bacteria.

Robert Anderson
Two Harbors, Minn.

To date, all of Cliver's data come from boards with a face-grain surface. "We're only just getting into products that have an end-grain work surface, such as the old chopping blocks used to have," he says. Such end-grain surfaces, he notes, "would be much more porous and perhaps would accelerate the uptake of an organism because the wood's vessels would be exposed end-on."
— J.A. Raloff

I wonder if the mechanism Cliver and Ak are looking for is the hydrological, mechanical porosity of the wood itself. If the bacteria are killed by desiccation, then they would expire whether embedded in the cut, untreated wooden boards or on the uncut surfaces of the wood and plastic. But in the cut surfaces of the plastic, they would be embedded in non-water-porous material and well protected from drying and hot-water-and-soap washing.

The fact that all seven woods tested have the same antibacterial action and that the wood treated with mineral oil acts like the impermeable plastic materials would reinforce this interpretation.

As a piano tuner-technician, I know some good pianists can feel a difference between equally polished plastic and ivory keys. I suspect that the difference lies in the porous nature of the ivory, which extracts moisture and oils from the fingers at the finger-key contact point.

Bruce N. Gillies
Los Angeles, Calif.

A possible explanation of Cliver and Ak's results is that the dry wood absorbs moisture

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from the pathogens and collapses and kills them. If so, we must keep cutting boards dry (and for insurance possibly add a warmer).

Alexander L. Feldman
Novato, Calif.

During my initial interview with Cliver, I posed the dry-out hypothesis for wood's apparent antimicrobial properties. But he noted that to control for dehydration's potential effect, some of the studies maintained boards in humidified chambers. This moisture-saturated air kept wooden boards from drying out. Even under these conditions, he said, the bacteria disappeared from wooden boards. — J.A. Raloff

All my life I've had nicks, cuts, and scratches that sometimes required antibiotics to heal. About three years ago I retired and now spend most of my time working with wood. The fine dust doesn't do much for my breathing, but I've noticed that, while I still get the nicks and cuts, I never get any kind of infection. Is this because there is an antibacterial in the lignin, or is it because the chemical affinity of cellulose and water causes the water to be pulled out of the nasty little beasties?

Robert A. Breed
Somerset, Calif.

Wood, especially hardwood, has a fairly large proportion of lignin, a well-known polyphenol. Molecules of a rigid, well-anchored polymer like this cannot move out of the way of a knife blade, which breaks molecules at random. In a shallow cut in the wood, quite a few billion lignin structures are physically depolymerized. Some of their fragments may resemble thymol, menthol, or other active pherolic antiseptics, or they may contain stable (for a while) free radicals.

Robert Townend
Elkins Park, Pa.

Should we now be very careful about reusing plastic containers because simple washing with soap and water does not decontaminate them?

On a more scientific note, it seems reasonable that wood possesses antibacterial activity because trees don't have immune systems, as animals do. What happens if bacteria are incubated with sawdust or woodchips? What is the effect of heating or boiling the wood boards? Is the effect merely a surface phenomenon such as dehydration, or is there a chemical or enzyme in the wood? An enzyme might digest the bacteria; a chemical could destroy cells, hence no bacterial bodies are found.

If the effect is caused by a chemical or enzyme, then maybe this could act as a "natural" food preservative. Alternatively, the researchers may have found a new class of antibiotics.

Charles Davy
Phoenicia, N.Y.

Your questions mirror those that Cliver and Ak have posed themselves. While they don't have any answers yet, Cliver says they "are trying to figure out what's going on." For example, with the collaboration of the USDA's Forest Products Laboratory, on the University of Wisconsin-Madison campus, they're using an electron microscope to examine treated wood for microbes. They have also begun incubating suspensions of the bacteria with ground wood. "Some of the initial results with these wood flours indicate that the bacteria won't be killed outright," he says. "But it sure takes some doing to get them back off the wood." — J.A. Raloff

Confusing spin on Earth's orbit

Please tell me that my 1950s physics courses are not as out-of-date as "Photon drag: New spin on making a black hole" (SN: 2/6/93, p.86) indicates. The article states, "Just as Earth's rotation provides a centrifugal force that prevents our planet from falling into the sun. . . ." Maybe it is quibbling over semantics, but I thought that it was not Earth's rotation but Earth's orbital movement around the sun that causes the centrifugal force that counteracts the gravitational forces that would otherwise pull our planet into the sun. (It is true that this orbital motion is a rotation — around the sun — but that is not what was implied by the sentence.)

Samuel L. Vance
Huntsville, Ala.

In using the word "rotation," we did mean Earth's orbital motion about the sun, not Earth's spin. But we regret any confusion this wording may have caused. — The editors

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